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On the Osmotic Pressures of some Concentrated Aqueous Solutions.

By the Earl of BERKELEY and E. G. J. HARTLEY.

(Communicated by W. C. D. Whetham, F.R.S. Received May 28,—Read June 7, 1906.)

(Abstract.)

This communication gives an account of measurements of osmotic pressures of aqueous solutions of cane sugar, dextrose, galactose, and mannite. The method adopted is that briefly outlined by us in Vol. 73, 'Roy. Soc. Proc.' A gradually increasing pressure is placed upon the solution (which is separated from the solvent by a semi-permeable membrane) until the solvent, which at first flows into the solution, reverses its direction and is squeezed out. The pressure, when there is no movement of the solvent, is considered to be the osmotic pressure. Owing to the difficulty of determining the exact point at which no movement takes place and for other reasons, the experiments are carried out so as to enable an observation to be made of the rate of movement of the solvent, both when the pressure on the solution is just below and when just above the turning point pressure. The osmotic pressure is deduced from these rates.

The range of pressures covered by the experiments is from 12 to 135 atmospheres.

A description is also given of the methods adopted for making the copper ferrocyanide membranes, and it is pointed out that with the best membranes, in most cases, a small quantity of solution comes through during the experiment. It is shown that even a small leak causes a considerable lowering of the observed pressure; hence the final results accepted are those where the leak was least.

Attention is drawn to the fact that the osmotic pressures of cane sugar solutions when measured directly and when calculated from their vapour pressures agree to within 3 per cent.

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